Speech by Alexander Graham Bell, November 2, 1911

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The Telephone 37 37 “ THE PRE-COMMERCIAL PERIOD OF THE TELEPHONE ”

(An historical address delivered by Alexander Graham Bell, November 2, 1911, in Boston, Massachusetts, at the first meeting of the Telephone Pioneers' Association. Taken from “New England Telephone Topics” for November 1911 pp 15–19; and revised by Mr. Bell for the Beinn Bhreagh Recorder). Revised notes in G. Bell's handwriting on file.

Mr. Chairman, Ladies & Gentlemen: This is a great day for me and perhaps for you — the first meeting of the Telephone Pioneers of America, and of the world.

It gives me great pleasure to meet with you all today; and, yet, there is a feeling of sadness about it. I am the first telephone pioneer, and my memory goes back to the very beginning; and I miss the faces I remember so well, the faces of the old pioneers, whom I wish were here today.

The Association is fortunate and the telephone system of America is fortunate that one of these old pioneers is at the head of matters today — Mr. Theodore M. Vail (applause), that great organizing mind that presides over the destinies of the telephone system of America. (Applause).

I feel it a little presumptuous upon my part to try to speak of the telephone to telephone men. (Laughter). You have all gone so far beyond me! Why, the little telephone system that I look back upon — what is it compared to the mighty system that goes through the whole extent of our country today? It is to you that this great development is due, and I feel that it behooves me to speak very modestly of the little beginning that led to this great end.

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I cannot tell you anything about the telephone. I cannot speak to you about undulating currents, intermittent currents, and pulsatory currents. I belong to the past, you belong to the present; and it occurs to me that perhaps the most useful feature of my address today might be to call to your minds some of the notable events of the past that preceded the commercial organization and development of the telephone. That is a matter upon which I can give information; that is the point on which many of you may be weak. You know all about many of the later developments; you may not be so familiar with the earlier ones.

The period that marks the incipiency of the telephone extends from the year 1874 to 1877. It was in 1877 that the telephone really began its commercial career. I shall leave the time after that period to my friend, Mr. Lockwood, and shall deal chiefly with the points that preceded 1877. Of course, in dealing with this period of the history of the telephone I shall have to be somewhat personal, for it all centered upon me in those days.

From 1873 until the beginning of 1876 I was a resident of Salem, Massachusetts, and came into Boston every day for my professional work. Then I would spend my summer vacations in Canada, at Brantford, at the home of my parents. So these three places — Salem, Boston and Brantford — are concerned in the early days of the telephone.

Boston is par excellence the home of the telephone, 3 for it was here that all the apparatus was made and where the important experiments went on. Brantford, in Canada, was my thinking place, where I would go and spend my summer holidays and look over the line of experiments that had been made in Boston and plan for the future. I generally went to Brantford about the middle of July, stayed there during the summer and was back in Boston the first of October.

First Conception in Brantford, Canada, Summer of 1874

And so it happened that in the summer of 1874, during my visit to my father's house in Brantford, Ontario, considering myself and discussing with my father the numerous

experiments I had made in Boston relative to the reproduction of musical sounds by electricity for the purposes of multiple telegraphy, the thought of the membrane telephone was elaborated. So that the conception of the telephone originated in Brantford, Ontario, in the summer of 1874.

You are all familiar with it. It was practically the same instrument that was shown in the patent that is marked upon our little memento here. It was a theoretical conception of a magneto telephone, a very daring conception, if I may be allowed to say so — that the vibrations of the voice might create electrical impulses like the aerial impulses, and produce an audible result at the other end.

To tell you the truth, as a practical man, I did not quite believe it; as a theoretical man, I saw a speaking 4 telephone and that theoretically we had the means of reproducing speech in distant places. But it really seemed too good to be true that you could possibly create electrical impulses that would amount to any practical purpose by the action of the voice itself.

And so, on my return to Boston in October, 1874, and all through that winter and through the spring of 1875, instead of making the apparatus and trying it I was trying to devise methods of increasing the strength of these electrical undulations. I was working at what is now known as the variable resistance method. That is shown very well in a letter that I wrote to Mr. Hubbard on the fourth of May, 1875, when I was experimenting on the passage of a voltaic current through a vibrating wire, with the idea that the variation of tension in that wire, by producing variations in the resistance of the circuit, would produce the electrical undulations that I desired.

From the summer of 1874 up until June 2, 1875, the development of the telephone was delayed by this thought, that the magneto-electric impulses would not be sufficient by themselves and would require a battery current.

First Telephone made in Boston, June 1875

Then came the discovery, with which you are all probably familiar, that a magneto-electric current would produce by itself sonorous effects at a receiving station and you may remember the plucking of reeds that went on, on that 5 celebrated June 2, 1875. In a moment all the difficulties in the way of the practical solution of the telephone disappeared, and orders were given at once to construct the membrane telephone that was conceived in Brantford in 1874.

When it was first tried it was somewhere about the end of June or July 1, 1875. We have records of experiments on July 1, 1875, and I well remember these experiments. We had only one membrane telephone, and the receiver was one of the old tuned reed receivers. It was held up to the ear. You crammed the armature against the ear to dampen its vibrations. I was listening at that armature while Mr. Thomas A. Watson, my assistant, was down in the basement of Charles Williams, Jr.'s, building, 109 Court Street, shouting at the end of the telephone, and then we changed places and instruments. I may say that I heard nothing.

Then Mr. Watson went downstairs to listen, and I went upstairs to speak, and while I was speaking Mr. Watson came rushing up the stairs in a state of great excitement, saying, “Why, Mr. Bell, I heard your voice very distinctly, and could almost understand what you said.” (Laughter).

Well, that was gratifying, but it would have been still more gratifying if I could have heard that too. You see, Mr. Williams' workshop was a very noisy place. Mr. Watson was accustomed to that noise and could hear a good deal better than I. I was more accustomed to throwing out my voice than Mr. Watson so that he had the advantage of 6 me in hearing and I had the advantage of him in speaking. The results would be considered very unsatisfactory at the present time; yet, encouraged by the results, poor as they were, I went ahead immediately to prepare specifications for a patent.

Patent Specification Completed October, 1875.

In September, 1875, I was at work upon the specification of the now celebrated patent which I wrote myself. In October, 1875, the patent was completed. But it was not filed in October, 1875. A long delay ensued, because I was so imbued with an idea of the value of this great invention that I was not satisfied to take out patents for America alone — I must take them out for every country on earth. But that, you know, required money, and I did not have the money.

Mr. Saunders and Mr. Hubbard, who were associated with me as capitalists paid the cost of my experiments and of the American patent. They were too wise to touch foreign patents. So I had to go ahead and see what I could do to get this great patent taken up abroad, and that caused great delay.

I went up to Canada to interview friends in Canada, and at last made an agreement with the Hon. George Brown, who was at one time Premier in Canada, that he and his brother, Gordon Brown, would take out patents in England, and perhaps other countries, on one condition — that I should not file my application for an American patent until I had word from them that it would not interfere with the applications abroad.

And so it was that the American patent dragged on 7 for months, until at last Mr. Hubbard just said a quiet word to my solicitors in Washington — “It is no use waiting longer for Mr. Brown; just you put in the patent.” And the patent was filed without my knowledge or consent. It is very fortunate that he did so. It saved a great deal of trouble and interference in the patent office, and so forth, and that is the patent on which the whole telephone system of the United States has been based.

I think it might be well to speak of a few of the more important points. The patent was filed February 14, 1876; it was granted March 7, 1876. I was in Washington at the time when

it was allowed. I know it was allowed on March 3, 1876, because that happened to be my birthday, and it came to me as a sort of birthday present.

After the granting of the patent came a period of publication, and I want to speak now of a very curious thing. In the case of new inventions we are generally led to believe that the public is ready to swallow anything, but that grave scientific men are the most skeptical of all. I found this not to be true in the case of the telephone. The public generally and the business men of the country were very slow to perceive any value in the telephone. The scientific world, on the other hand, took it up at once.

My first paper upon the subject was delivered here in Boston before the American Academy of Arts and Sciences on May 10, 1876. Then I was invited to lecture before the Society of 8 Arts at the Institute of Technology, on May 25, 1876.

Then came a very notable event, which I shall speak of very slightly, although it really forms the basis for the knowledge by the world of the telephone. It was the Centennial Exhibition, in 1876.

The Centennial Exhibition in Philadelphia (1876)

Mr. Hubbard and Mr. Saunders, who were financially interested in the telephone, wanted this instrument to be exhibited at the Centennial Exhibition. In those days — and I must say even up to the present time I am afraid to say it is true — I was not very much alive to commercial matters, not being a business man myself. I had a school for vocal physiology in Boston. I was right in the midst of examinations. My pupils, those studying under me, were studying to become teachers of the deaf, teaching speech to the deaf, and I could not be bothered at that time by having to go to Philadelphia and attend the exhibition.

However, we found, in connection with the exhibition, that all the apparatus involving a necessity for quiet was to be examined on Sunday, June 25; and so it was urged that Sunday would interfere less with my professional pursuits than another day. I agreed,

therefore, to go down and spend Sunday, and no longer. I could not possibly stay any longer than that while in the midst of my examinations. So I went down to Philadelphia, growling all the time at this interruption to my professional work, and I appeared in Philadelphia on 9 Sunday, the 25th.

I was an unknown man and looked around upon the celebrities who were judges there, and trotted around after the judges at the exhibition while they examined this exhibit and that exhibit. My exhibit came last. Before they got to that it was announced that the judges were too tired to make any further examination that day and that the exhibit would be examined another day. That meant that the telephone would not be seen, for I was not going to come back another day. I was going right back to Boston.

Dom Pedro, Emperor of Brazil, saves the Telephone Exhibit June 25, 1876

And that was the way the matter stood, — when suddenly there was one man among the judges who happened to remember me by sight. That was no less a person than His Majesty Dom Pedro, the Emperor of Brazil. I had shown him what we had been doing in teaching speech to the deaf in Boston, had taken him around to the city school for the deaf and shown him the means of teaching speech, and when he saw me there he remembered me and came over and shook hands and said, “Mr. Bell, how are the deaf mutes of Boston?” I said they were very well and told him that the next exhibit on the programme was my exhibit. “Come along,” he said, and he took my arm and walked off with me, and, of course, where an emperor led the way the other judges followed. (Laughter) And the telephone exhibit was saved.

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Well, I cannot tell very much about that exhibit, although it was the pivotal point on which the whole telephone turned in those days. If I had not had that exhibition there, it is very doubtful what the condition of the telephone would be today. But the Emperor of Brazil was the first one to bring that situation about at that time. I went off to my transmitting

instrument in another part of the building, and a little iron box receiver — you probably all know what it was from diagrams — was placed at the ear of the emperor. I told him to hold it to his ear, and then I heard afterwards what happened. I was not present at that end of the line. I went to the other end and was reciting “To be or not to be, that is the question,” and so on, keeping up a continuous talk.

I heard afterwards from my friend, Mr. William Hubbard, that the emperor held it up in a very indifferent way to his ear, and then suddenly started and said, “My God! it speaks!” and put it down. Then Sir William Thomson took it up and listened.

I was in another part of the building shouting away to the membrane telephone that was the transmitter. Suddenly I heard a noise of people stamping along very heavily, approaching, and there was Dom Pedro, rushing along at a very un-emperor-like gait, followed by Sir William Thomson and a number of others, to see what I was doing at the other end. They were very much interested. But I had to go back to Boston and couldn't wait any longer. I went that very night.

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Now, it so happened there, that although the judges had heard speech emitted by the steel disc armature of this receiving instrument, they were not quite convinced that it was electrically produced. Some one had whispered a suspicion that it was simply the case of the thread telegraph, “the lovers' telegraph,” as it was known in those days, and that the sound had been mechanically transmitted along the line from one instrument to the other.

Of course, I did not know about it at that time; but when the judges asked permission to remove the apparatus from that location I said, “Certainly, do anything you like with it.” But I could not remain to look after it. They had to look after it themselves.

My friend, Mr. William Hubbard, who had kindly come up from Boston to help me on this celebrated Sunday, the 25th of June, said he would do his best to help them out, although he was not an electrician. He knew nothing whatever about the apparatus,

beyond being in my laboratory occasionally, knowing me well. But he undertook to remove this apparatus and set up the wire under the direction of the judges themselves. So they had an opportunity finally of satisfying themselves that speech had really been electrically reproduced.

Sir William Thomson's announcement was made to the world in England, before the British Association, and the world believed — and from that time dates the popular interest in the telephone.

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Preparing for long-distance transmission July 1876

That was the 25th of June, 1876 at the Centennial Exhibition in Philadelphia. Of course, the judges and others were anxious to know whether this thing would operate on a long line. Experiments had been made from one room to another in a building; but that was not quite as satisfactory as having one telephone in one place and another in another miles off. So I was asked whether I would venture to try the instrument between Boston and Philadelphia. Well, I, in my ignorance of the conditions, said, of course, “yes.”

So when I went to Boston I began to consider, “Now, what are we going to do? These instruments are only prepared for short circuits.” So we began to make experiments in Boston to fit the instrument for use on a longer line. I knew that we must have many turns of quite fine wire in the instrument; so I had such instruments constructed, and then the Atlantic and Pacific Telegraph Company in Boston kindly lent me the use of their wires for experiment.

On July 7, July 9, and July 12, 1876, attempts were made to use the telephone upon various circuits from Boston to New York, from Boston to Rye Beach, and other places, but unfortunately, with poor success. We did not get any vocal sounds on these circuits, although with two instruments, one in one room and another in another room of the

Equitable Building, and a circuit to Rye Beach we did get some audible effect. But still the results were unsatisfactory where the undulating current was employed.

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We tried the intermittent current. I had a parlor organ and made connection with New York and asked the operator to listen and see if he could hear anything. I played tunes on the parlor organ, and he was asked if he could hear anything, and he replied by telegraph, yes he could hear " elegantly. " When asked what it was he had heard he replied laconically "Yankee Doodle." He could hear tunes and that was really the only result of importance obtained in those trials of July 7, 9, and 12, 1876.

Telephone presented to Sir William Thompson July 1876 almost ruins the English Patent

Sir William Thomson was present at one of these trials, and I presented to him a telephone that we used on that occasion, and it was taken to England and bothered me exceedingly in telephone litigation at a subsequent time.

The owners of my English patent had to disclaim everything that was shown in those instruments. But it fortunately happened that the receiving instrument was one of those old Centennial box receivers with the metallic lid, which in this case was one of ferro-type iron, and when I gave this instrument to Sir William Thomson I was afraid he would lose the armature, and so I had Mr. Watson screw the armature down at one point to the magnet, to hold it in place. Sir William just threw the whole thing into his trunk without packing it up, and when it arrived in England the armature, 14 instead of being flat, we cocked up like that. Well, that saved the English patent. (Laughter).

Everybody got the idea that the vibration was from this cocked-up thing. The English publications all showed the cocking up of the armature. When it finally came before the Supreme Court of England, when they were deciding the case, the thing looked rather slim, according to the English law. Only the shreds of the patent were there — nothing

was left but the metallic diaphragm. But they made a very singular decision. They declared that, by a “benevolent construction” of the law, and in order to save a great invention, they decreed that the cocking up of the armature did not interfere with the patent for metallic armature, and the patent was saved! (Laughter).

First Transmission of Speech over a Telegraph line in Brantford, August, 1876

That brings me up to July 12, 1876, in my Boston experiments. Then came my summer vacation of 1876. I went up to Brantford, Ontario. I prepared a whole lot of apparatus, telephones with coils of different kinds, high resistance coils and low resistance coils, long coils and short coils, and I carried them up with me to Brantford, Ontario, and continued attempts to get results with long distance lines.

The Dominion Telegraph Company of Canada kindly lent me the use of its wires, and I look upon one experiment there as of very great importance. It was an experiment made in August, 1876. The transmitting instrument was in Brantford, 15 Ontario; the receiving instrument, the Centennial iron box receiver, was in Paris, at a distance of eight miles from Brantford and the battery on the circuit was in Toronto, about sixty miles away. So we had a circuit of somewhere from sixty to seventy miles. The transmission went one way only, but speech was transmitted between persons at a distance of several miles. But it was only one way; the persons at the other end could not reply, but had to telegraph back by another wire.

In August, 1876, quite a number of experiments that attracted attention were made on the wires of the Dominion Telegraph Company. There was one experiment between Brantford and Mt. Pleasant, a distance of about five miles and then I gave an exhibition from my father's house at a country place four or five miles from Brantford, known as Tutelo Heights. It was about a quarter of a mile from the house to the nearest telegraph line. We got a lot of stove pipe wire, cleaned the town out of stove pipe wire, and tacked the wire on the fence from my father's house to the corner of the Mt. Pleasant road, and then attached

it to the telegraph wire leading into Brantford. Then I had some friends in Brantford who spoke, sang and recited into the membrane telephone, while a large number of guests at my father's house at Tutelo Heights listened to the transmission; and on that occasion also three voices were transmitted simultaneously. I had three mouthpieces made for the membrane telephone and three persons sang to the 16 same telephone.

So those experiments at Brantford were the first experiments that were really successful in transmitting speech from one place to another at a distance, but they were all one-sided, not reciprocal.

First Conversation over a telegraph line. Reciprocal Communication established in Boston, Oct. 9, 1876

The first reciprocal communication occurred after my return to Boston in October, 1876. On October 9th, occurred the first conversation by telephone between persons separated by miles of space. This was on the Walworth Manufacturing Company's line, connecting its factory in Cambridgeport with the office in Boston. It was not a very long distance, probably two and one-half miles, but free communication was carried on, and I think that was an historical occasion. Mr. Watson was at one end of the line and I was at the other, and we kept a record of what passed. I noted what I said and what I thought I heard him say, and he did the same thing at the other end of the line, and the parallel columns were reported in the newspapers, especially in the Boston Advertiser, October 19th. I think that was the first time that conversation had actually been carried on between two persons separated by miles of space. The space, however, was not great, only about two and one-half miles.

And so we went on during 1876 with experiments, 17 trying to increase the distance at which results could be obtained. For that purpose the Cambridge Observatory offered its services. They had a private line from Cambridge to Boston for transmitting time signals from the Cambridge Observatory, and through Professor Rogers I had the use of that

line at night, when it was not needed for time signal purposes. I had it connected with my laboratory and by night made experiments between the Cambridge Observatory and Boston, trying to ascertain the conditions fit for telephone service on long lines.

Increasing the Distance of Transmission to 143 Miles Dec. 3, 1876

Then came a really noteworthy series of experiments on the lines belonging to the Eastern Railroad Company. An experiment was made on November 26, 1876, in which conversation was carried on between myself, in Boston, at the Eastern Railroad depot, and Mr. Thomas A. Watson in Salem. We had increased the distance to eighteen miles. Then we experimented on a line that led to North Conway, 143 miles away, so that Salem was a way station to North Conway. That was a very notable extension. It was determined that we should send a man to North Conway with a stack of apparatus, with all sorts of modifications. Now that we had a chance of trying it out on a 143-mile circuit we were determined to take advantage of it, if we had to spend all day and night on it. All sorts of apparatus was carried. I was in Boston and he in North Conway. I think that was really 18 the most important experiment that had been made in connection with the real commercial stage.

This experiment was on December 3, 1876, when we had free communication between Boston and North Conway. On this occasion we tried varying the coils, trying small wire, thick wire, long coils, short coils, tried it with and without a battery and as a result of the experiments we gave up the battery and took to the magneto telephone alone, in the laboratory.

That takes us up to the end of 1876. There is hardly anything more I can tell you about it before it came into commercial use. On January 13, 1877, I gave a lecture on the subject at the Philosophical Society in Washington. On January 31, 1877, there was an experiment here in Boston that attracted a good deal of attention at the time, although it did not compare with the other experiments in importance. It was a communication

between the rubber shoe factory and the residence of Mr. Converse in Malden, but it attracted a great deal of public attention to the telephone. On January 21, there was a public exhibition of the line of the Eastern Railroad, in which no battery was used. Conversation was carried on between Boston and Salem.

Japanese, the first Foreign Language sent by Telephone 1876–1877

By the by, at about that time, in the early part 19 of 1877 or the end of the year 1876, a rather interesting incident occurred. I had among my students at Boston University a young Japanese student named Isawa. He came to me for the purpose of studying the pronunciation of English. Of course, when he heard about the telephone he became very much interested. He said, “Mr. Bell, will this thing talk Japanese?” I said, “Certainly, any language.” He seemed very much astonished at that, and said he would like to try it.

Mr. Isawa went to our end of the circuit and I stood at the other. He talked in Japanese and I reported the result to him. “Yes, certainly, it talks Japanese, but unfortunately I don't understand the language.” (Laughter).

He was not quite satisfied with that and asked permission to bring two Japanese friends who were then studying in Harvard College. They came and talked successfully through the telephone; so that Japanese was the first foreign language to be spoken over the telephone.

The two Japanese gentlemen, students at Harvard University, were exceptional men. I did not know at the time who they were, but years afterwards their names were revealed to me.

I was in Japan, in Yokohama, when the American Residents in Japan were giving a banquet to the new Japanese Minister who was going to Washington, Mr. Komura, now at the head of affairs in Japan. I was asked to attend the banquet, and instead of being

introduced to Mr. Komura he came up to 20 me and said, “I don't require an introduction to Mr. Bell. I knew him years ago.” And he turned out to be one of the Japanese students.

Then I found out about the other one in a rather curious way. The Japanese government sent to this country at the time of the Russian-Japan War Baron Kaneko. He came to Washington and gave a lecture before the National Geographic Society. I happened to be president of that Society at the time and entertained him at dinner. When the dinner was over and the time for speaking came, Baron Kaneko said, “I knew Mr. Bell years ago,” and he told his story about the use of the telephone.

So those two men, the foremost men in Japan today, Baron Kaneko and Baron Komura, were the two men who heard the telephone in the winter of 1876–1877. (Applause.)

The Essex Institute Lecture; and the opening of the first Telephone line April 4th, 1877

A few more words and I shall have done. On February 12, 1877, I gave a lecture before the Essex Institute in Salem, Massachusetts, and the lines were connected with Boston. Speech was transmitted between Boston and Salem, and the audience generally could hear the sound of the speaker's voice, while those who came close to the telephone were able to converse with Mr. Watson in Boston. At the invitation of the Essex Institute this lecture was repeated on February 23, 1877, an admission fee was charged; and on this occasion certain of the proceeds were presented to me 21 for my lecture on the telephone. I immediately went into Boston and we had a little silver model of the telephone made, and it is interesting now to look back upon the fact that this was made from the first money ever made in the telephone.

On that occasion a very interesting incident took place. A Boston Globe reporter had the brilliant idea that he would send a despatch to his paper in Boston by telephone, and on that occasion the first newspaper despatch ever sent by telephone was sent to Boston for the Boston Globe. That, I think, more than anything else, woke up the press of the world

to the advantage of the telephone. That article in the Boston Globe was copied all over the world, and had a great influence in modifying public opinion.

On April 3, 1877, we talked perfectly freely between Boston and New York. On April 5, 1877, there was a lecture in Providence, Rhode Island, which was attended by a great many people, and speech was transmitted from Boston to Providence, and a bugler in Boston, who was well known in Providence, played, the sounds being heard all over the large hall in Providence, Rhode Island.

On April 4, 1877, was opened the first telephone line, the first line specially built for telephonic purposes. It simply connected the office of Mr. Charles Williams, Jr., in Boston, with his house in Somerville. It was a short line, but it was the first of the hundreds of thousands of miles of telephone wire that have since been laid. (Great applause).

AGB.